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[11] **4,158,880**

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[54] **MINE MACHINE LIGHT**

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[51] **Int. Cl.**[2] **F21V 15/00**; H01R 13/60; F21L 7/00; F21V 23/00

[52] **U.S. Cl.** ..... **362/376**; 339/119 L; 362/89; 362/164; 362/367

[58] **Field of Search** ..... 362/89, 164, 158, 267, 362/344, 376–378, 367–369, 374, 375; 339/119 L, 182 L

[56] **References Cited**

U.S. PATENT DOCUMENTS

2,413,381	12/1946	Rylsky	362/382
2,752,480	6/1956	Priebe	362/382
3,569,692	3/1971	Johnson	362/267
4,069,415	1/1978	Dacal	362/267

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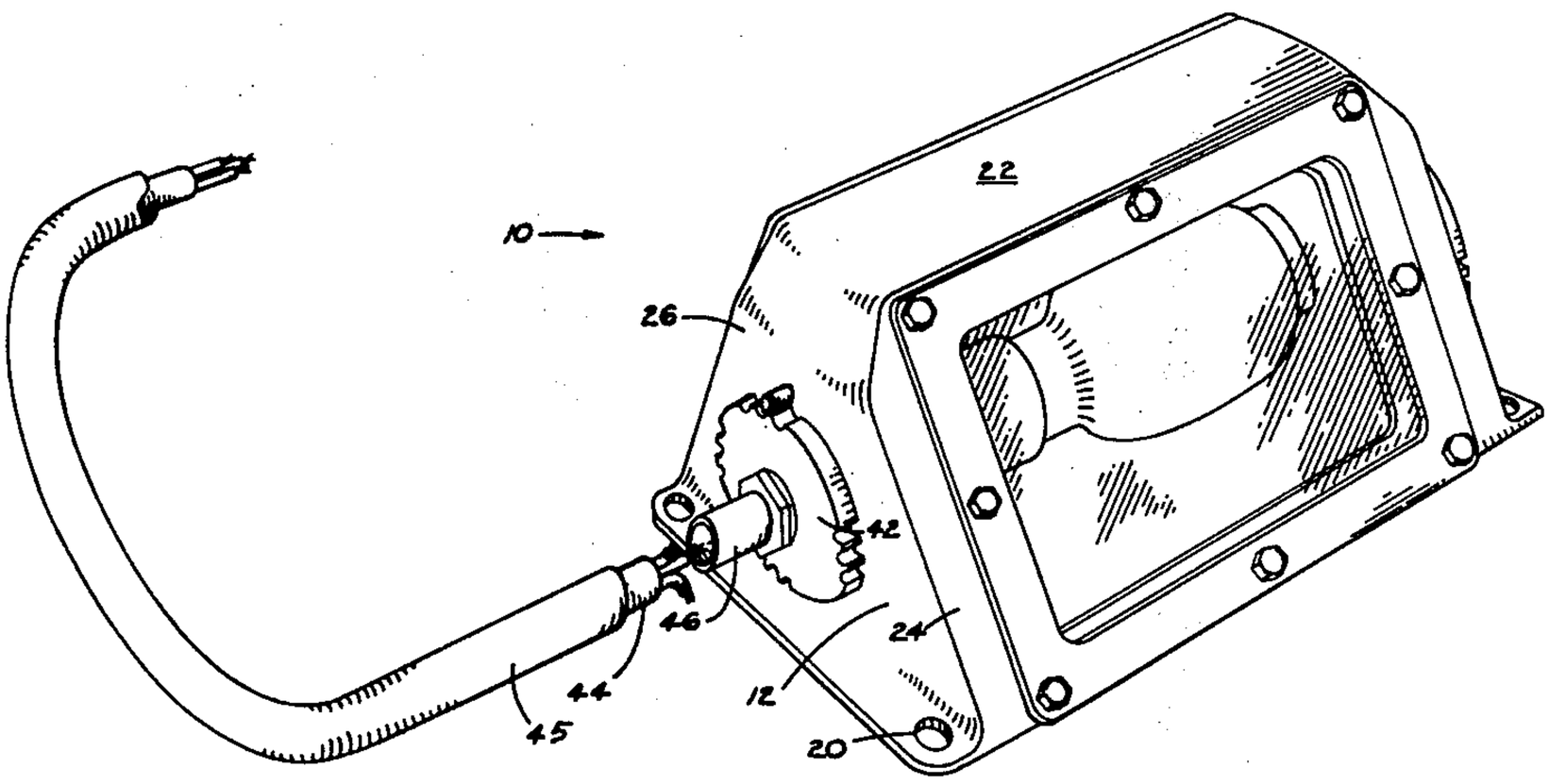
[57] **ABSTRACT**

The light has an explosion-proof housing that is of generally triangular transverse section, with no glass on the narrow front or top wall. In mine use, should rock drop onto the housing it is likely to strike glass parts only a glancing blow. The glass parts are arranged to be resiliently sealed to the cast or fabricated metal body of the housing, but be removable from the outside, so a broken glass part need not cost a whole light fixture. A spring resiliently supports the outer end of the bulb upon the housing to cushion against mechanical jolts.

8 Claims, 6 Drawing Figures



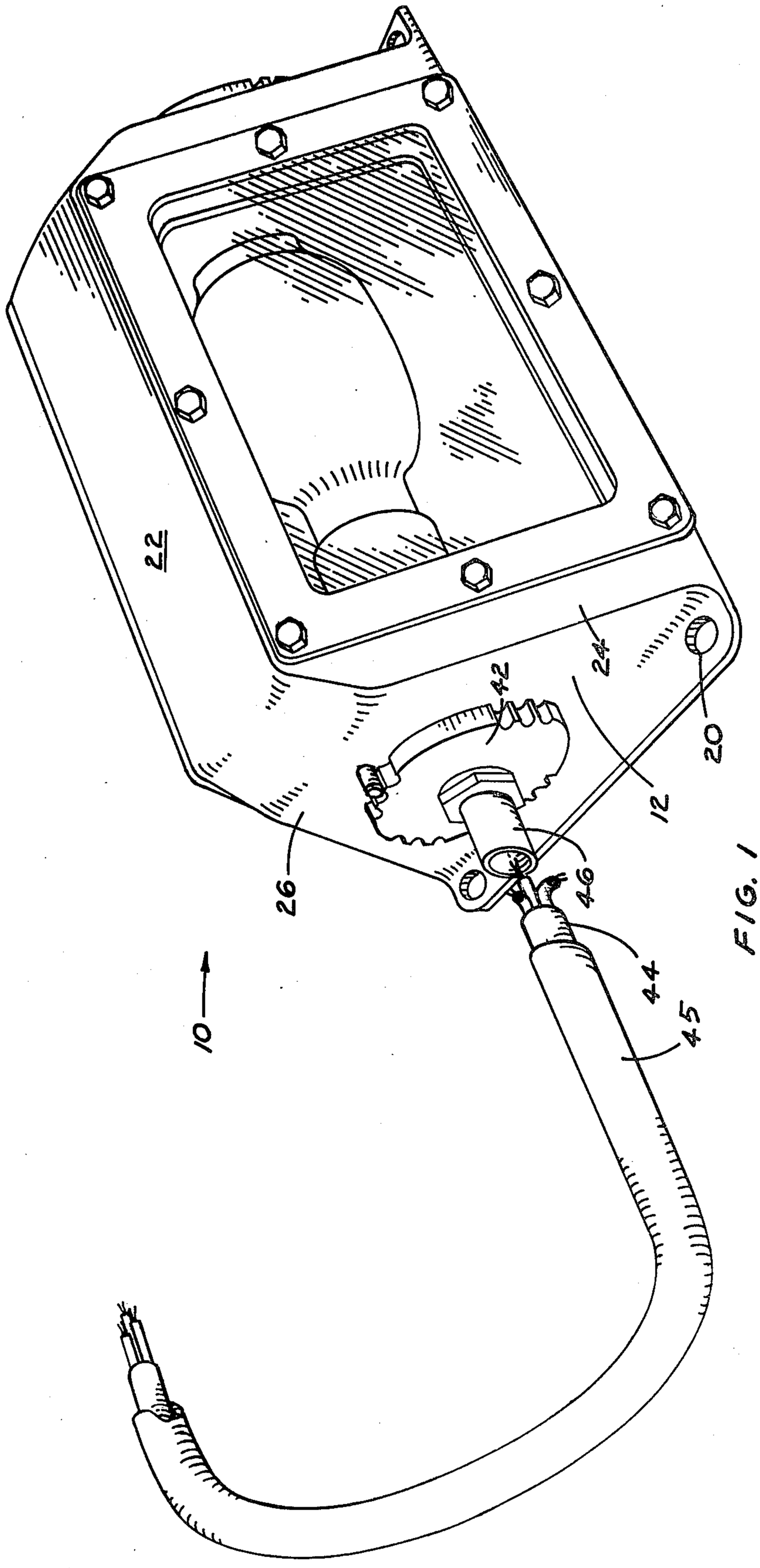


FIG. 1

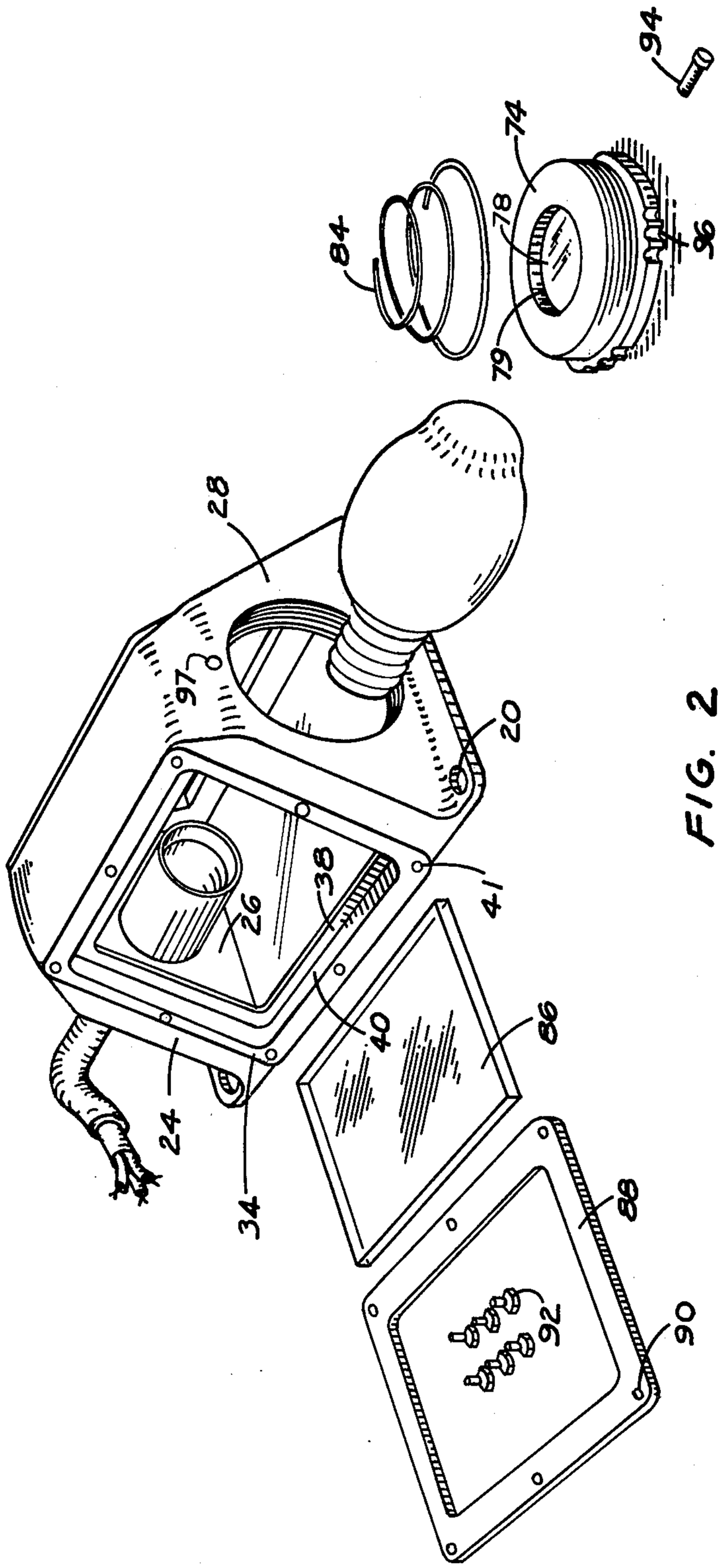


FIG. 2

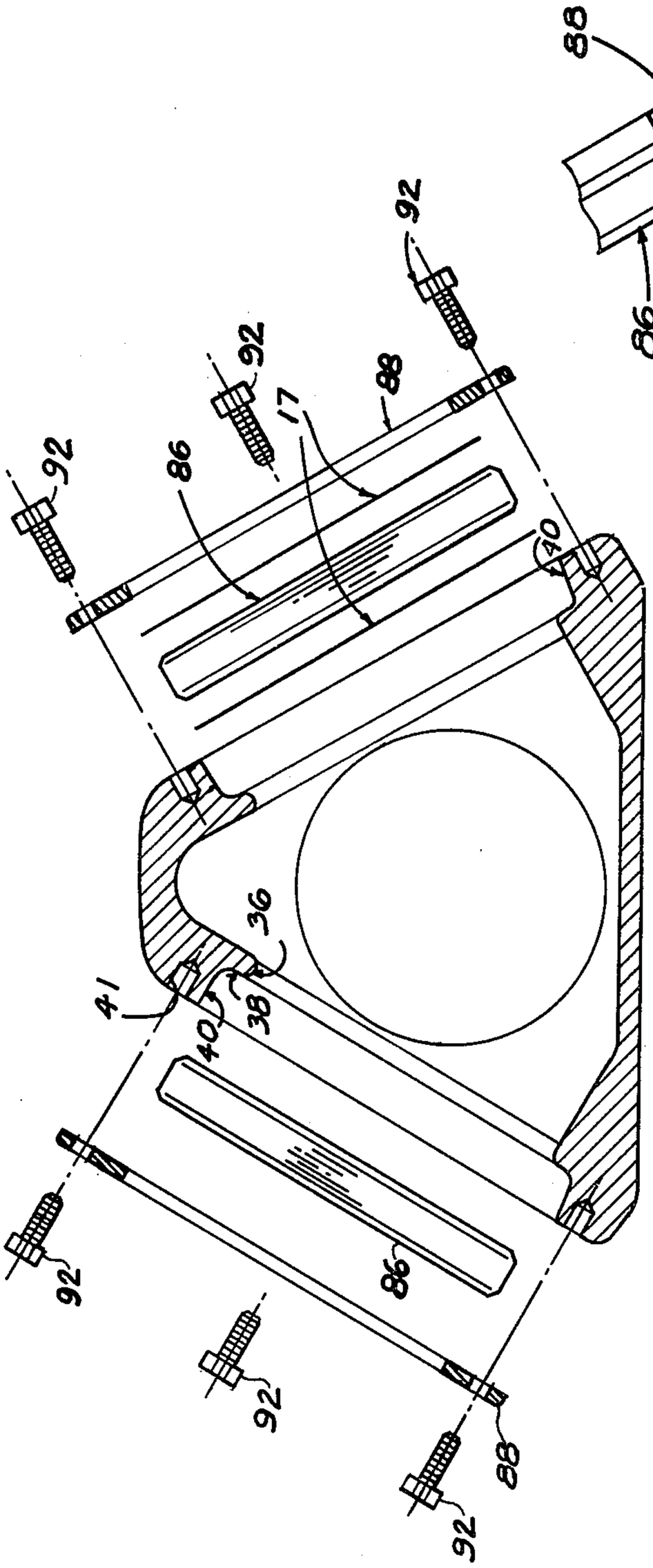


FIG. 3

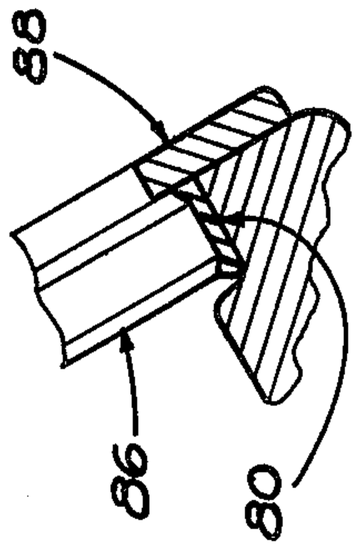


FIG. 4b

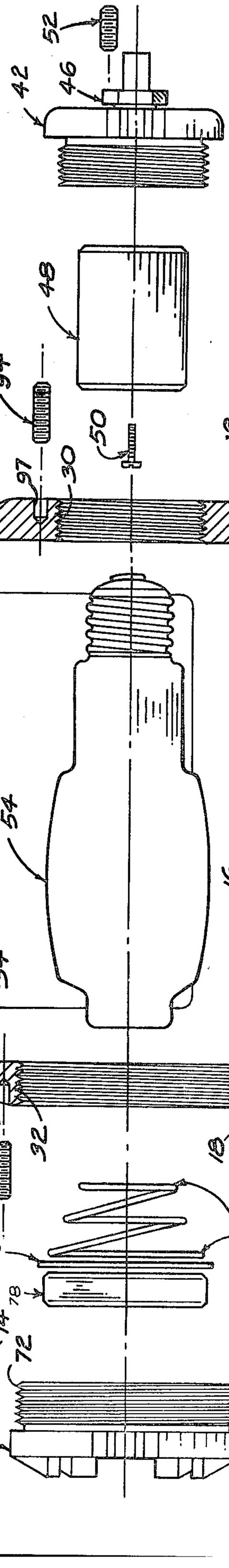


FIG. 4

MINE MACHINE LIGHT

BACKGROUND OF THE INVENTION

In recent years, better mine lighting has become a requirement. However, the combination of conditions mine lighting must meet is unique. Such lighting as was immediately available when Federal legislation mandated improved lighting has not been conceived with as much and as broad attention as thereafter has come to bear on this part of technology.

In the course of preparing this disclosure of the invention, the inventor has become aware of the following prior U.S. patents.

The following show lamp housings that present lenses at an angle in a generally triangular arrangement.

U.S. Pat. No. Des.35,857; Pause; Apr. 8, 1902
U.S. Pat. No. Des.60,322; Damm; Feb. 7, 1922
U.S. Pat. No. Des.71,571; Wilhelm; Nov. 30, 1926
U.S. Pat. No. 2,018,788; Johnson; Oct. 29, 1935
U.S. Pat. No. 2,413,381; Rylsky; Dec. 31, 1946
U.S. Pat. No. 2,752,480; Priebe; June 26, 1956

SUMMARY OF THE INVENTION

The light has an explosion-proof housing that is of generally triangular transverse section, with no glass on the narrow front or top wall. In mine use, should rock drop onto the housing it is likely to strike glass parts only a glancing blow. The glass parts are arranged to be resiliently sealed to the cast or fabricated metal body of the housing, but be removable from the outside, so a broken glass part need not cost a whole light fixture. A spring resiliently supports the outer end of the bulb upon the housing to cushion against mechanical jolts.

The presently contemplated primary field of use for the lamp is as a light fixture for mounting on an underground mining machine, not as a headlight, but on top or on the sides of the machine for illuminating the mine wall or roof. Of course, the same lamp could be used elsewhere.

The features of the presently preferred embodiment of the lamp are particularly noteworthy:

(1) Note "triangular" shape with no glass on the narrow front or top wall. If a rock drops onto the fixture, it will hit the metal part between the glass parts, or will strike the glass part a striking glance and be less likely to break it.

(2) In contrast to the prior art the inventors know about, the glass windows are resiliently mounted and can be changed from the outside, because they are sealed into the recess of the rim of the housing, then the rectangular retainer is put against the glass and housing and bolted on. Resilient silicone rubber sealant/adhesive ("RTV") or equivalent shall be used.

(3) There is a spring which is inserted between the outer end of the light bulb and the end cap of the housing. This resiliently supports the bulb end to prevent the bulb from rapping against the inside of the housing as the mining machine is jolted during use.

It should be noted that while this light is specifically tailored for mine use, by having an explosion-proof housing, the features that make it explosion-proof have been used in housings of substantially different design. In general, should an explosion take place for whatever reason within the housing, the path by which the hot gases would begin to escape is along screw threading between housing parts. By the time the gases have traversed the path, they exit from the housing too cooled to initiate an explosion of mine gases.

The principles of the invention will be further discussed with reference to the drawings wherein a preferred embodiment is shown. The specifics illustrated in the drawings are intended to exemplify, rather than limit, aspects of the invention as defined in the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. **1** is a perspective view of the mine machine light;

FIG. **2** is an exploded perspective view of the mine machine light of FIG. **1**;

FIG. **3** is an exploded transverse cross-sectional view thereof depicting an intermediate portion; and

FIG. **4** is a longitudinal sectional view of the mine machine light.

FIG. **4***a* is a fragmentary cross-sectional view of the inspection end cap, and

FIG. **4***b* is a fragmentary cross-sectional view of an annular side wall, both for showing a preferred manner of mounting the glass plates therein.

DETAILED DESCRIPTION OF THE PRESENTLY PREFERRED EMBODIMENT

The mine machine light **10** includes a housing or casing **12** that is generally triangular in transverse cross sectional shape (FIG. **3**).

For sake of easy discussion, let us assume the attitude shown in FIGS. **3** and **4** is the attitude that the light would have in use upon a mining machine, since this is a likely one.

Thus, the housing **12** includes a metal body **14** that is preferably a casting. In small numbers, it could be fabricated of plate. The body **14** has a flat, generally rectangular floor or base **16**, which has laterally extending flanges or ears **18**. The light is secured to a mine machine (or other mounting), e.g. by inserting bolts through the holes **20** in the flanges **18**. Of course the flanges **18** could be tack welded to the mine machine or the flanges **18** could be bolted to a plate (not shown) that was, in turn tack welded to the mine machine.

The body **14** further includes a narrow generally rectangular outer wall **22**, distally of the base **16**. Two generally rectangular annular opposite side walls **24** each have a first long margin in common with a respective long margin of the base **16** and a second long margin in common with a respective long margin of the outer wall **22**. There are two opposite, generally triangular end walls, a holder cap end **26** and an inspection cap end **28**.

Each end wall **26**, **28** has a respective centrally placed, internally threaded opening **30**, **32** therethrough.

Each side wall **24** resembles a picture frame, in comprising a broad marginal portion **34** which extends around the whole perimeter thereof. At its inner edge, the margins **34** are reduced in thickness, from the outside, to provide an inner perimetrical flange **36** with a planar shoulder surface **38** which faces outwardly, surrounded by a recess surface **40** that is generally normal to the shoulder **38**. In the margin **34**, several perimetrically spaced, internally threaded, outwardly opening sockets **41** are provided.

An exteriorly threaded end cap **42** in the form of a plug is provided for closing the opening **30**, while pro-

viding a passageway along the threading for cooling off escaping gas should a bulb burst.

The electrical service cable **44** is admitted through protective conduit **45** and into the sealing fitting **46** secured in the cap **42** to serve the socket **48**. The socket **48** is mounted to the inside of the cap **42** via the screws **50**. A retainer **52** prevents the gland **46** from backing away from providing a secure, sealed connection.

Within the housing, an electric light bulb **54** is received in the socket **48**. The bulb may be of any type in such use. Presently incandescent, sodium vapor and mercury vapor lamps are used.

The opening **32** in the inspection end wall **28** is closed by an exteriorly threaded inspection cap **70** of plug-shape. The exterior threading **72** on the cap **70** is provided on an axially inwardly projecting flange **74** which has an annular, axially inwardly facing shoulder **76** within its lumen, near its base. The path along the helical threading **72** provides another cooling outlet for gases should a bulb burst. An inspection glass plate **78** is received in the recess so defined within the cap flange **74** and secured, e.g., by being sealed at **80**, to the internal surface **82** of the cap flange **74**. Snap ring **83** is installed in a groove **85**, in cap **70**, as shown, providing a backing for the glass plate **78**.

The recess within the flange **74** is axially deeper than the glass plate **78** is thick, so when the plate **78** is installed, a shallower recess **79** remains radially within the flange **74**, axially inwardly of the glass plate **78**. Here, a helical compression spring **84** is received against the axially inner face of the snap ring **83**, so that when the cap **70** is screwed in place, the spring bottoms on the snap ring **83** in the shallow recess **79**, compresses and resiliently supports the outer end of the bulb **54**, which it engages.

One important key to the construction as shown in FIG. **3** is the aforementioned recess **38, 40** in the sidewalls. These receive glass plates **86** whose rear and outer margins are sealingly secured, such as by silicon rubber sealant/adhesive to the surface **40**. Then a respective rectangular, annular retainer **88** is placed against each sidewall exterior, engaging the bridging between the recess **38, 40** is uniformly deeper than the glass plates **86** are thick, thus enabling the plates to be resiliently displaced within the recess as the compliant seal remains intact, thereby enhancing impact absorption. The retainers **88** have holes **90** through them corresponding in location to the threaded sockets **41**. Screws **92** are threaded into the sockets **41** through the openings **90** to mechanically retain the glass plates in place.

If desired or needed, the glass plates may be faced as at **17** with shatter resisting plastic film, reinforcing wire mesh or the like. The plastic tape that is preferred for this use suppresses glare and provides abrasion and impact protection.

Note that should the light be placed in service so that its outer wall **22** faces outwardly and/or upwardly, i.e. forwardly with respect to the direction from which a shower of rocks or other mechanical impacts can be expected, there is a good likelihood the impacts will strike the wall **22** and bounce off, or strike only a glancing blow upon the glass plate **86**.

However, should an impact break a plate **86**, there is no need to discard the light **10**. Rather, the respective screws **92** and retainer **88** are removed, the broken lens, window, glass plate **86** is removed and the channel **36, 38** is cleaned out. A suitable solvent may be used. Then, a new glass plate is adhered and secured in place as described above.

The glass plate **86** may be of any approved type, and may even be a composite of wire and glass, plastic and glass, etc., as is known in the art.

The body of the housing may be cast of, e.g. commercial grade 319 aluminum alloy or welded mild carbon steel plate.

Screws **94** are received through respective notches **96** in the end caps into threaded sockets **97** in the respective housing end walls to retain the end caps against threadably backing out of the respective openings **30** and **32**.

Items **11, 13** and **15** are name plates, serial number plates, instruction plates or the like, e.g. held in place by adhesive means or, e.g., screws **19**.

It should now be apparent that the mine machine light as described hereinabove, possesses each of the attributes set forth in the specification under the heading "Summary of the Invention" hereinbefore. Because it can be modified to some extent without departing from the principles thereof as they have been outlined and explained in this specification, the present invention should be understood as encompassing all such modifications as are within the spirit and scope of the following claims.

What is claimed is:

1. A mine machine light, comprising:

a housing having a unitary body of hollow, generally triangular transverse cross-sectional shape;

said body including a generally rectangular base wall, an outer wall that is generally rectangular, and substantially narrower than said base wall, two generally rectangular sidewalls, each having one respective margin shared with a respective margin of the base wall and an opposite respective margin shared with a respective margin of the outer wall, and a respective generally triangular wall each with an outer margin perimetrically joined to respective ends of the two sidewalls, the base wall and the outer wall;

a light socket within the housing;

gland means in one end wall for sealingly passing an electrical cable through that end wall to connect with the light socket; and

means defining an opening through each sidewall;

means defining an outwardly facing shoulder on each sidewall perimetrically bordering the respective opening, each shoulder being recessed below the exterior of the respective sidewall;

a plate of light transmitting material received in each opening against the respective shoulder to close the respective opening and thus provide a window to the exterior of the housing;

means perimetrically securing each plate against the respective shoulder.

2. The mine machine light of claim **1**, wherein:

the securing means for each plate comprises an adhesive/sealant interposed between the respective plate and the respective shoulder.

3. The mine machine light of claim **2**, wherein:

the securing means further comprises a respective bezel fitted against each respective plate and the respective sidewall; and means mechanically securing the respective bezels to the respective sidewalls.

4. The mine machine light of claim **3**, wherein:

the mechanical securing means is constituted by threadably, exteriorly removable fasteners, so that said plates may be individually removed from the exterior of the housing for replacement if broken.

5. The mine machine light of claim 3, further comprising:

means defining an interiorly threaded opening through each end wall of the housing, and an exteriorly threaded plug removably threaded into each respective opening and having a path helically proceeding along the threading thereof for the cooling escape of gases should a light bulb burst within the housing, said gland being provided through one said plug, whereby the housing is provided with an explosion-proof character for mine use.

6. The mine machine light of claim 5, further comprising:

a lamp secured in said socket, an electric cable electrically connected to said socket and exiting from the housing through said gland.

7. The mine machine light of claim 6, further comprising:

a compression coil spring resiliently compressed between the opposite end wall from said socket, and said lamp for supporting said lamp distally of said socket.

8. The mine machine light of claim 2, wherein the adhesive sealant is made of resilient material and provides a resilient mounting of said plates.

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